

From the INTERNATIONAL BUREAU

PCTNOTIFICATION CONCERNING
TRANSMITTAL OF COPY OF INTERNATIONAL
PRELIMINARY REPORT ON PATENTABILITY
(CHAPTER I OF THE PATENT COOPERATION
TREATY)

(PCT Rule 44bis.1(c))

To:

HENNEMAN, Larry, E., Jr.
HENNEMAN & ASSOCIATES, PLC
714 W. Michigan Ave.
Three Rivers, MI 49093
ETATS-UNIS D'AMERIQUEDate of mailing (*day/month/year*)
24 April 2008 (24.04.2008)Applicant's or agent's file reference
0025-013P1PCT**IMPORTANT NOTICE**International application No.
PCT/US2006/039521International filing date (*day/month/year*)
10 October 2006 (10.10.2006)Priority date (*day/month/year*)
11 October 2005 (11.10.2005)Applicant
FLEXTRONICS AP LLC et al

The International Bureau transmits herewith a copy of the international preliminary report on patentability (Chapter I of the Patent Cooperation Treaty)

The International Bureau of WIPO
34, chemin des Colombettes
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Authorized officer

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PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference 0025-013P1PCT	FOR FURTHER ACTION		See item 4 below
International application No. PCT/US2006/039521	International filing date (<i>day/month/year</i>) 10 October 2006 (10.10.2006)	Priority date (<i>day/month/year</i>) 11 October 2005 (11.10.2005)	
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237			
Applicant FLEXTRONICS AP LLC			

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).

2. This REPORT consists of a total of 6 sheets, including this cover sheet.

In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

- | | | |
|-------------------------------------|--------------|---|
| <input checked="" type="checkbox"/> | Box No. I | Basis of the report |
| <input type="checkbox"/> | Box No. II | Priority |
| <input type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| <input type="checkbox"/> | Box No. IV | Lack of unity of invention |
| <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/> | Box No. VI | Certain documents cited |
| <input type="checkbox"/> | Box No. VII | Certain defects in the international application |
| <input type="checkbox"/> | Box No. VIII | Certain observations on the international application |

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. +41 22 338 82 70	Date of issuance of this report 16 April 2008 (16.04.2008)
	Authorized officer Beate Giffo-Schmitt e-mail: pt03.pct@wipo.int

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To: LARRY E. HENNEMAN, JR.
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PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing
(day/month/year) 02 AUG 2007

Applicant's or agent's file reference

0025-013P1PCT

FOR FURTHER ACTION

See paragraph 2 below

International application No.

PCT/US 06/39521

International filing date (day/month/year)

10 October 2006 (10.10.2006)

Priority date (day/month/year)

11 October 2005 (11.10.2005)

International Patent Classification (IPC) or both national classification and IPC

IPC(8) - H04N 5/225 (2007.01)

USPC - 348/374

Applicant

FLEXTRONICS AP LLC

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/US
Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450, Alexandria, Virginia 22313-1450
Facsimile No. 571-273-3201

Date of completion of this opinion

29 March 2007 (29.03.2007)

Authorized officer:

Lee W. Young

PCT Helpdesk: 571-272-4300
PCT OSP: 571-272-7774

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US 06/39521

Box No. I Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of:
 - ☒ the international application in the language in which it was filed
 - ☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).
2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material
 - ☐ on paper
 - ☐ in electronic form
 - c. time of filing/furnishing
 - ☐ contained in the international application as filed
 - ☐ filed together with the international application in electronic form
 - ☐ furnished subsequently to this Authority for the purposes of search
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US 05/39521

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	4,7, 9,11,14, 18-20,22,27-34,36,43,44,46-48	YES
	Claims	1-3,5, 6, 8, 10,12,13,15-17, 21, 23-26, 35, 37-42,45,49-51	NO
Inventive step (IS)	Claims	NONE	YES
	Claims	1 - 51	NO
Industrial applicability (IA)	Claims	1 - 51	YES
	Claims	NONE	NO

2. Citations and explanations:

Claims 1-3, 5, 6, 8, 10, 12, 13, 15-17, 21, 23-26, 35, 37-42, 45, and 49-51 lack novelty under PCT Article 33(2) as being anticipated by US 2005/0212947A1 to Sato et al. (hereinafter 'Sato').

Regarding claims 1, 16, 17, and 37, Sato teaches an apparatus, a method of using the apparatus, and a method of manufacturing a camera module (present invention relates to an image capture apparatus used in an electronic camera, para. [0002], packaging methods for the solid state imaging device, para. [0005]) comprising an image capture integrated circuit chip (solid state imaging device, para. [0005]); a lens (lens, para. [0007]); and a lens holder mounted on the image capture circuit chip, whereby the lens is positioned relative to the image capture integrated circuit chip (cylindrical-shaped lens holding frame, para. [0007]). (Note: claim 1 teaches the combination of the elements of claims 16 and 17.)

Regarding claim 2, 21, and 38 Sato teaches a protective cover disposed over a sensor array of the image capture integrated circuit chip (a protector which covers an outer periphery of the lens holding frame, para. [0013]).

Regarding claim 3, Sato teaches that the lens holder is molded on a top surface of the image capture integrated circuit chip (a protector which covers an outer periphery of the lens holding frame, para. [0013]).

Regarding claims 5, 25, and 41, Sato teaches that the lens holder defines a recess for receiving the lens (Along an inner periphery of a lens holding frame, a groove is formed., [abstract]).

Regarding claim 6, 26, and 42 Sato teaches that the recess positions the lens relative to the image capture integrated circuit chip when the lens is placed in the recess (When the lens holding frame is attached to the solid state imaging device to cover it, the groove of the lens holding frame is engaged to the projection of the solid state imaging device., [abstract]. Note: the lens holding frame holds the lens relative to integrated circuit.).

Regarding claims 8 and 45, Sato teaches that the lens is affixed to the housing such that there is a gap between at least a portion of the lens and the image capture integrated circuit (the spacer is projected from that of the semiconductor substrate and the transparent plate, para. [0012]. Note: the spacer would provide the gap.).

Regarding claim 10, Sato teaches that the lens is a component of a lens assembly (an image sensor chip on which light receiving portion is formed is mounted on a subsidiary substrate, then a ceramic frame is disposed on the subsidiary substrate so as to surround the image sensor chip, and then a transparent plate is disposed on the ceramic frame so as to seal the image sensor chip., para. [0005]).

Regarding claims 12 and 13, Sato teaches at least one electrical contact disposed to electrically couple the image capture integrated circuit chip to an electronic device (the solid state imaging device 40 can be electrically connected to the circuit board 50, para. [0031], Fig. 4,5).

Regarding claims 15, 35 and 49, Sato teaches that the lens holder is mounted on a top surface of the image capture integrated circuit chip within the peripheral limits of the top surface (A groove is formed around an inner peripheral surface of the lens holding portion 34a, so as to fit on a projection which is formed around an outer periphery of the taking lens 32. Accordingly, the taking lens 32 can fit to be held in the lens holding portion 34a., para. [0028], Fig. 3).

Regarding claims 23 and 39, Sato teaches that the protective cover is a molded spacer (The spacer 46 is formed of an inorganic material, para. [0033], Fig. 4).

Regarding claims 24 and 40, Sato teaches that the protective cover is glass (a transparent cover glass, [abstract]).

Regarding claim 50, Sato teaches an electronic communications device comprising: communication circuitry for providing communication with another electronic communications device (a personal computer, a mobile phone, an electronic notepad or the like, para. [0004]); and a camera module (FIG. 1 is a perspective view of a front side of a mobile phone with a camera, para. [0010], Fig. 1) including an image capture integrated circuit chip having a photosensitive area (solid state imaging device, para. [0005]); and a housing mounted entirely on the image capture integrated circuit chip (a ceramic frame is disposed on the subsidiary substrate so as to surround the image sensor chip, para. [0005]).

—(Continued on Supplemental Pages)—

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/US 06/39521

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claim 51 refers back to claim 62, when it appears that claim 50 was intended. For the purpose of the search the Authority considers that claim 51 intended to refer back to claim 50, however, correction is suggested.

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

2. Citations and explanations:

Regarding claim 51, teaches a circuit substrate including at least a portion of the communication circuitry and wherein the camera module is mounted on the circuit substrate (the solid state imaging device has a structure where a frame-like spacer is disposed on a semiconductor substrate, para. [0011]).

Claims 4, 7, 9, 11, 14, 18-20, 22, 27-34, 36, 43, 44, and 46-48 lack an inventive step under PCT Article 33(3) as being obvious over Sato.

Regarding claim 4, although not explicitly taught in Sato, it would have been obvious to one skilled in the art that the lens holder could be preformed and adhered onto a top surface of the image capture integrated circuit chip, because preforming of parts associated with integrated circuits is well known in the art and often used in mass production to reduce costs.

Regarding claims 7, 27 and 43, although not explicitly taught by Sato, it would have been obvious to one of ordinary skill in the art that the lens holder could include a reference surface for fixing the distance of the lens from the image capture integrated circuit chip. A fixed distance is necessary to focus the lens and a reference surface would be useful in establishing this distance.

Regarding claims 9, Sato teaches a lens coupled to the lens holder (cylindrical-shaped lens holding frame, para. [0007]). Although not explicitly taught, it would be obvious to those of ordinary skill in the art that the lens could be coupled to the lens holder via an adjustable focus mechanism because adjustable focus mechanisms are often used to allow focusing of the lens after final assembly.

Regarding claim 11, although Sato does not explicitly teach that the image capture integrated circuit chip includes a photosensitive area and a non-photosensitive area, or that the lens holder is mounted on the non-photosensitive area so as not to occlude the photosensitive area, however, it would have been obvious by one of ordinary skill in the art to construct the camera taught in Sato in this fashion. It is common knowledge to those of ordinary skill in the art that an integrated circuit chip used as part of a camera assembly often includes a photosensitive area and a non-photosensitive area. If based on design considerations an integrated circuit of this type were chosen, it would be preferable to mount the lens holder so as not to occlude the photosensitive area so that the chip would work properly. That is, the photosensitive area would not be able to receive light and operate as part of a camera if it was blocked by the lens holder, therefore, the lens holder would need to be mounted so as not to block the photosensitive area.

Regarding claims 14, 32, and 46, although not explicitly taught in Sato, it would have been obvious to one of ordinary skill in the art that the lens holder could be formed on a top surface of the image capture integrated circuit chip, and the at least one electrical contact could be formed on a bottom surface of the image capture integrated circuit chip, if desired, based on design considerations. Ultimately, a manufacturer would have many choices as to which integrated chip to use to interface with a lens to make a camera assembly. The location of the lens holder, therefore, would be based on the construction of the integrated chip chosen.

Regarding claims 18, 19, 20, and 22, Sato teaches A solid state imaging device is consisted of an image sensor chip having a light receiving portion, a frame-like spacer attached on the image sensor chip so as to surround the light receiving portion ([abstract]), and also discusses manufacturing methods (in packaging methods for the solid state imaging device, (para. [0005]), however, Sato doesn't explicitly teach a plurality of devices, rather, Sato discusses them with regard to a single apparatus. However, it would have been obvious to those of ordinary skill in the art that the methods used to manufacture a single imaging devices could be applied to a plurality of devices including the following: simultaneously fixing the plurality of lens holders on the substrate - claim 19, separating the plurality of discrete image capture devices after the step of fixing the plurality of lens holders on the substrate - claim 20, placing the protective cover over each of the plurality of image capture devices occurs during the step of fixing the plurality of lens holders on the substrate - claim 22.

Regarding claims 28, 30 and 31, although not explicitly taught in Sato, it would have been obvious to one of ordinary skill in the art that the step of positioning the lens units in the lens holders (or attaching the lens - claim 30, or focusing the lenses - claim 31) could occur when the discrete image capture devices are still an integral part of the substrate. This method of manufacturing is known in the art and may be more cost effective than positioning the lens during a different stage of the process, for instance when the discrete image capture devices are no longer an integral part of the substrate.

Regarding claims 29 and 44, although not explicitly taught in Sato, it would have been obvious to one of ordinary skill in the art to attach a respective lens to each of the plurality of lens holders, because Sato teaches that a lens frame (holder) is provided for a lens (cylindrical-shaped lens holding frame, para. [0007]).

Regarding claims 33 and 48, although not explicitly taught in Sato, it would have been obvious to one of ordinary skill in the art that each of the image capture devices includes could include a via through the substrate (or silicon wafer - claim 48) to connect the image capture circuit with the electrical contact. Vias are well known in the art as a method of connection used in regards to circuit board manufacturing. A via could be used, if so desired, as the method of connection between the image capture circuit and the electrical contact.

Regarding claims 34 and 47, although not explicitly taught in Sato, it would have been obvious to one of ordinary skill in the art that the width of the lens holder could be substantially the same as a width of a respective one of the image capture devices, if so desired, based on design considerations..

Regarding claim 36, although not explicitly taught in Sato, it would have been obvious to one of ordinary skill in the art that separating the discrete image capture devices from one another; and wherein the step of fixing the plurality of lens holders on the substrate includes forming a lens holder entirely on at least one of the plurality of individual image capture devices after the step of separating the discrete image capture devices could be accomplished, if so desired, because it would be necessary to separate the devices in order to use them in separate applications.

Claims 1 - 51 have industrial applicability as defined by PCT Article 33(4), because the subject matter can be made or used in industry.